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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/845,245	04/27/2001	Mark M. Wang	263/168	2862

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EXAMINER

HANLEY, SUSAN MARIE

ART UNIT	PAPER NUMBER
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1651

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

5/1

Office Action Summary	Application No.	Applicant(s)	
	09/845,245	WANG ET AL.	
	Examiner	Art Unit	
	Susan Hanley	1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 44-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 44-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>16 pages</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Examiner Susan Hanley has assumed the evaluation of this application. Her contact information appears at the end of this Office Action.

Election/Restrictions

Applicant's election without traverse of Group I, claims 1-15 and 44-46 in the reply filed on 5/20/04 is acknowledged.

Claims 1-15 and 44-46 are presented for examinations. Claims 16-43 and 47-81 have been cancelled.

Claim Suggestions

For ease of reading, it is suggested that the word "includes" be changed to "comprises" in claims 2, 4, 5, 8 and 9.

Claim Objections

Claim 11 is objected to because of the following informalities: the letter "n" appears between the words "characterization" and "involves" in line 1 of the claim. It appears to be a typographical error. Appropriate correction is required.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-15 and 44-46 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-20 of U.S. Patent No. 6,744,038. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of the patent is a specie of the genus of the claims of the instant application. The method claimed in '038 is a specie of the instantly claimed

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method because a method of moving particles in a medium, wherein both the particles and the medium have a dielectric constant, by subjecting the particles to an optical gradient force inherently practices the steps of the instantly claimed method. The broadest reasonable interpretation of “characterizing the particle” in claim 1 of the instant application is that simply observing the physical position of the particle after the illumination step inherently provides information about the particle. “Characterization” is a mental step and therefore does not require express physical manipulation. Therefore, the claimed method of ‘038, inherently practices the generic method of the instant application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-15 and 44-46 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-41 of U.S. Patent No. 6,778,724. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of the patent is a specie of the genus of the claims of the instant application. The claims of ‘724 are drawn to a method and device to apply radiation-type force, which can be a laser, to a particle in a microfluidic stream such that the particle is propelled to move to a new downstream location. The broadest reasonable interpretation of “characterizing the particle” in claim 1 of the instant application is that simply observing the physical position of the particle after the illumination step inherently provides information about the particle. “Characterization” is a mental step and therefore does not require express physical manipulation. Therefore, the claimed method of ‘724, inherently practices the generic method of the instant application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-15 and 44-46 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-18 of copending Application No. 10/053,507. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of copending application is a specie of the genus of the claims of the instant application. The claims of ‘507 are drawn to

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a method of separating particles by subjecting particles to an optical force that moves some of the particles to a different location. The broadest reasonable interpretation of “characterizing the particle” in claim 1 of the instant application is that simply observing the physical position of the particle after the illumination step inherently provides information about the particle. “Characterization” is a mental step and therefore does not require express physical manipulation. Therefore, the claimed method of ‘507, inherently practices the generic method of the instant application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-15 and 44-46 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-10 and 25-48 of copending Application No. 09/993,318. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of co-pending application is a specie of the genus of the claims of the instant application. The ‘318 claims are drawn to methods of employing a moving optical gradient to exert a force on particles in a fluid path, wherein said force is based on the dielectric constant of the particle. The broadest reasonable interpretation of “characterizing the particle” in claim 1 of the instant application is that simply observing the physical position of the particle after the illumination step inherently provides information about the particle. “Characterization” is a mental step and therefore does not require express physical manipulation. Therefore, the claimed method of ‘318, inherently practices the generic method of the instant application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-15 and 44-46 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-14 of copending Application No. 09/993,389. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of co-pending application is a specie of the genus of the claims of the instant application. The claims of ‘389 are drawn to a method of reducing the force between a particle and a surface system by subjecting the particle to two light

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intensity patterns that will sort the particles and then move the particles in an amount and direction to reduce the interaction between the particle and the surface. The broadest reasonable interpretation of “characterizing the particle,” in claim 1 of the instant application is that simply observing the physical position of the particle after the illumination step inherently provides information about the particle. “Characterization” is a mental step and therefore does not require express physical manipulation. Therefore, the claimed method of ‘389, inherently practices the generic method of the instant application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-15 and 44-46 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-83 of copending Application No. 10/243,611. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of copending application is a specie of the genus of the claims of the instant application. The claims of ‘611 are drawn to methods of determining one or more biological properties of a cell by subjecting the cell to a force generated by an optical gradient and determining the biological property of the cell as a function of the interaction of the cell with the force. The practice of these steps inherently executes the steps of the instant application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-15 and 44-46 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-13 of copending Application No. 10/324,926. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of copending application is a specie of the genus of the claims of the instant application. The ‘926 claims are drawn to a method for determining whether a cell is cancerous by subjecting the suspect cell and a control cell to a force generated by an optical gradient and comparing their relative displacements caused by their respective interactions with the optical force. The practice of these steps inherently executes the steps of the instant application.

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This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-15 and 44-46 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 5-16 of copending Application No. 09/993,376. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of copending application is a specie of the genus of the claims of the instant application. The '376 claims are drawn to methods of separating particles by subjecting particles with a force that is generated by a beam of coherent light, wherein said generated force moves some of the particles to a different location. The broadest reasonable interpretation of "characterizing the particle" in claim 1 of the instant application is that simply observing the physical position of the particle after the illumination step inherently provides information about the particle. "Characterization" is a mental step and therefore does not require express physical manipulation. Therefore, the claimed method of '376, inherently practices the generic method of the instant application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-15 and 44-46 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3 of copending Application No. 10/326,568. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of copending application is a specie of the genus of the claims of the instant application. The claims of '568 are drawn to a method of determining the level of cellular PKC activation by exposing cells to different concentration of PKC-activating compounds, subjecting the exposed cells to a moving optical gradient, measuring the displacement of the cells by the optical force and relating the displacement to the cell's response to the concentration of the PKC-activating compound. These steps correspond to the method of the instant generic invention.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

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Claims 1-15 and 44-46 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-12 of copending Application No. 10/326,796. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of copending application is a specie of the genus of the claims of the instant application. The '796 claims are drawn to a method of determining the onset of apoptosis in cells by exposing cells to a chemical compound, subjecting the exposed cells to a moving optical gradient, measuring the displacement of the cells by the optical force and relating the displacement response to the chemical compound. These steps correspond to the method of the instant generic invention.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-15 and 44-46 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-13 of copending Application No. 09/993,378. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of copending application is a specie of the genus of the claims of the instant application. The '378 claims are drawn to a method for analyzing particles by moving the particles by electrokinetic means, subjecting the particles to an optical force that can further displace the particle and analyzing the particles based on the results of the movements. These steps correspond to the method of the instant generic invention.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-15 and 44-46 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of copending Application No. 10/427,748. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of copending application is a specie of the genus of the claims of the instant application. The '748 claims are drawn to a method of determining the drug treatment protocol for a graft-versus-host disease patient having an oral lichen infection by incubating an activated T-cell from the patient's mouth with a panel of drugs, subjecting the incubated

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cells to a moving optical gradient and selecting a drug from the panel based on the measured travel distance of the cells. These steps correspond to the method of the instant generic invention.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-15 and 44-46 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-12 of copending Application No. 10/326,885. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of copending application is a specie of the genus of the claims of the instant application. The '885 claims are drawn to a method for identifying the inhibitory potential of a chemical compound to inhibit DNA topoisomerase I by treating a population of cells to varying concentration of the chemical compounds, subjecting the treated cells to optical interrogation and determining what compounds affected the cells. The specification of '885 provides an example that defines the meaning of "optical interrogation" wherein a cell is exposed to a chemical compound and then subjected to a moving optical gradient. The optical gradient generates a force that displaces the exposed cells and their distance of travel is measured by optical imaging. The distance traveled is related to the effect of the chemical compound on the cell (p. 23, section 0378). These steps correspond to the method of the instant generic invention.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-15 and 44-46 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-32 of copending Application No. 09/917,139 in view of Fuhr et al. (Appl. Physics A (1998) 67:385-390).

The claims of '139 are drawn to optical tweezers comprising laser light generates a forces that can spatially move an object that is subject to said laser light. The claims of '139 do not teach measuring the distance of displacement that the particle experiences after laser illumination and characterizing the particles based upon its reaction to the optical force generated by the laser.

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Fuhr et al. disclose a device and method for measuring optically induced forces on microparticles and cells. An optical tweezers system was integrated with a high frequency electric field cage (octopoles). The optical trap utilized a strongly focused laser beam which when directed toward a particle, causes the particle to experience a force that displaces the particle. Fuhr et al. teach that the disclosed set-up was employed to study the interaction between latex bead and red blood cells, as in claims 6, 12-15, 45 and 46 (p. 398).

It would have been obvious to employ the optical tweezers claimed by '139 to measure the displacement of a particle by an optical force and to relate the degree of displacement to characteristics of the displaced cell. The ordinary artisan would have been motivated to employ the optical tweezers of '139 in this manner because high quality optical tweezers can provide detailed information about a cell function. Furh et al. demonstrated that optical tweezers are designed expressly for this purpose. Thus, one of ordinary skill in the art would desire to employ the claimed optical tweezers of '139 in a method that corresponds to the genus claims of the instant application.

This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-15 and 44-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is rejected because the phrase "at least in part" is vague and indefinite. The phrase is relative and no comparison is made.

Claim 15 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 14. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). Claims 14 and 15 are drawn to the method of claim 1 wherein the

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characterization utilizes the “optophoretic constant” and the “optophoretic signature” of the particle. One page 17, the specification discloses that these two terms have the same meaning, and therefore, are interchangeable. Hence, claim 15 is a substantial duplicate of claim 14.

Claim 14 and 15 are rejected because the claim does not recite an analytical step that relates an optophoretic constant or signature to characterization of the particles.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-8, 11-15, 45 and 46 are rejected under 35 U.S.C. 102(a) as being clearly anticipated by Tsai et al. (Proc. of SPIE (July 2000) 4082: 213-221).

Tsai et al. disclose a method of using force measurement to gain information about objects at the microscopic level for biomedical research, as in claim 1. Tsai et al. teach that optical tweezers were generated by a set-up comprising a laser light and an inverted light microscope which generated a diffraction limited focus to

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produce a gradient of light intensity which served as a stable 3-D trap, as in claim 2-3 (p. 214, 3rd paragraph). Forward-scattered light and diffraction images were utilized to extract information about the motion of the object trapped in the tweezers at the sub-nanometer level, as in claim 4. To measure the stiffness of the optical tweezers, a second force, based on viscosity, was generated by oscillatory motion of the specimen by a DC motor-driven stage at constant velocity, as in claim 5. This technique enabled the investigators to characterize the immediate early events of cell-cell and molecular interaction with better precision in real time (p. 214, 2nd paragraph). Tsai et al. disclose that the optical tweezers were employed to study the displacement of a trapped bead (p. 217) and to analyze the binding between disintegrin and integrin proteins, as in claims 11-15, 45 and 46 (p. 219). Tsai et al. also disclose that the method was used to determine the adhesion between cells by with exerting 10 pN force on a cell in an interacting pair and determining the time until the cells were displaced from one another. The percentages of cell pairs that resisted the force and remained adhered were plotted as a function of the time to rupture (separation) of adherent cells (p. 218-19). This disclosure meets the limitations of claims 7 and 8 because cell pairs that were subjected to the optical force but did not separate or rupture were inherently non-moving. This state of non-movement, even when the cell-pair had been subjected to optical force, is indicative of the strength of the cell-cell interaction.

Claims 1-15 and 44-46 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Fuhr et al. (Appl. Physics A (1998) 67:385-390).

Fuhr et al. disclose a device and method for measuring optically induced forces on microparticles and cells. An optical tweezers systems was integrated with a high frequency electric field cage (octopoles), as in claims 1-5. The optical trap utilized a strongly focused laser beam which when directed toward a particle, causes the particle to experience both a scattering force and a gradient force, as in claims 2-4. The dielectric properties of particles and the surrounding liquid, as well as the field frequency, determine if the particle will be attracted to or repulsed by the electrodes of the electric field cage, as in claim 44. Fuhr et al. teach that the disclosed set-up was employed to study the interaction between latex bead and red blood cells, as in claims 6, 12-15, 45 and 46 (p. 398). Fuhr et al. further disclose that their set-up can be used to measure the temperature dependency of a cell or particle on the permittivity, conductivity and refractive index of a cell or particle and its surroundings. The heat produced in a cell or particle by

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the laser focus will alter its permittivity and conductivity. These changes will result in a changing particle rotation in a rotating electric field. The rotation speed of the particle or the cell is directly related to the heat production inside, as in claims 7-10, 14 and 15 (p. 389, right column, 3rd paragraph).

Claims 1-15 and 44-46 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang et al. (US 6,778,724)

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Wang et al. disclose a method of sorting particles in a microfluidic environment by utilizing VCSEL optical tweezers. The optical tweezers arises from either pushing the particles due to an optical scattering force or from pulling them due to an attractive optical gradient force. Wang et al. teach that VCSEL tweezers are suitable for integration into optical array devices that can perform detection and manipulation. The detection can extend to sensing some characteristic or state of the particle. An optical array device comprising a microfluidic network and optical tweezers could move particles or cells and sense a characteristic or state due to the movement (col.15, lines 15-42).

Claim Rejections - 35 USC § 102/103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the

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obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 5, 611-15 and 44 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Grier et al. (6,055,106).

Grier et al. disclose an apparatus and method for manipulating small dielectric particles wherein a laser beam and diffractive optical element interact to produce a plurality of light beams to create an array of optical traps for manipulating small dielectric particles, as in claims 1-3 and 44 (abstract). Grier teaches that in the prior art, optical traps, otherwise known as optical tweezers, comprise optical gradient forces from a single beam of light to manipulate a particle. Grier et al. disclose that their invention is an improvement over the prior art optical tweezers systems because a single beam from a laser can produce a number of optical traps, which can be static or time dependent diffractive optical elements. for a dynamic, or time dependent version, one can create time changing arrays of the optical traps. This dynamic system meets the limitations of claim 3 because a changing array of light constitutes the movement of the optical array relative to objects in the path of the array. This meets the definition of moving optical gradient field on p. 21 of the specification. Grier et al. teach that the device and method can be used as an array for chemical and biological assays or for the movement of small particles from one location to another location, as in claims 6 and 11-15 (col. 1, lines 32-35). The disclosure by Grier et al. anticipates the limitations regarding "characterizing the particle" of claim 1. The broadest reasonable interpretation of "characterizing the particle" is that simply observing the physical position of the particle after the illumination step inherently provides information about the particle. "Characterization" is a mental step and therefore does not require express physical manipulation. Therefore, the method of Grier et al. wherein a particle is subjected to optical force and is manipulated to a new position anticipates claim 1 because the observation of the new position inherently provides information about the particle.

In the alternative, if the characterization of the particle is interpreted as a separate, physical step in the claimed method and there is no anticipation, the disclosure by Grier et al. would, nevertheless, have rendered the claimed method *prima facie* obvious to one of ordinary skill in the art at the time the claimed invention was made because Grier et al. suggest using their method as part of an assay to gain information about chemical or biological

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particles. One of ordinary skill in the art would have had a reasonable expectation of success that a particle could be characterized based on its interaction with an optical force because the subjection of entities to a force, such as an electrical force, to separate, identify or characterize said particles (i.e. electrophoresis) is well known.

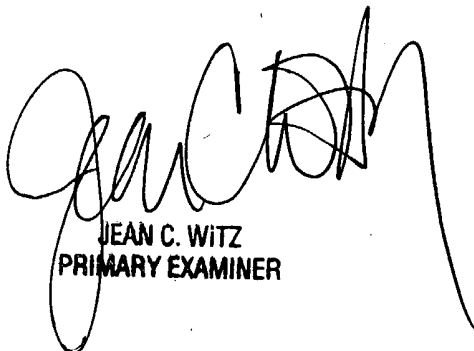
Thus, the claimed invention as a whole was at least *prima facie* obvious, if not anticipated by the reference, especially in the absence of an objective showing of surprising or unexpected results.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susan Hanley whose telephone number is 571-272-2508. The examiner can normally be reached on M-F 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Examiner
Art Unit 1651
8/20/04



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